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ABSTRACT

A user-based research and programing process was undertaken to identify environments supportive of mainstreaming handicapped students. This report first describes the range of strategies that have been developed to implement mainstreaming programs in public schools, then develops a guide for designers to help them understand the educational and developmental needs of handicapped children. Types of handicaps, their incidence, and their nature are explained. The identified critical design principles for mainstreamed schools were derived from a review of the scientific and professional literature and behavioral observations and interviews. The report then presents a set of 18 design principles for the programing and design of environments for mainstreaming, each with supporting research-based arguments and detailed criteria. Drawings accompany the design criteria and a bibliography concludes the report. (Author/MLF)

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MAINSTREAMING THE HANDICAPPED: A DESIGN GUIDE

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EA 014 284

The School of Architecture & Urban Planning
The University of Wisconsin-Milwaukee

MAINSTREAMING THE HANDICAPPED: A DESIGN GUIDE

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MAINSTREAMING THE HANDICAPPED: A DESIGN GUIDE

ABSTRACT

Educating handicapped children in the least restrictive environment--including integration in public school facilities--is an emerging trend called mainstreaming. Presently, design responses to the new needs created by mainstreaming are limited in scope and focus mainly on barrier-free environments. Barrier-free design is an important but incomplete approach to a wide range of problems in mainstreaming. A number of reasons explain the professions' focus on physical disabilities and on physical solutions for problems related to physical handicaps. A survey of both literature and selected facilities confirms that the broader range of handicapped children, as well as the broader concept of mainstreaming are barely addresed by environmental design.

To provide more appropriate environments which are supportive of mainstreaming, a user-based research and programming process was undertaken. The key activities included (1) identification of user-needs in the mainstreaming context (2) development of design principles and recommendations responsive to these needs.

The report points toward a series of issues involved is supporting shared experiences and common settings for exceptional and regular students. Appropriate design principles suggest the important characteristics of environments which promote children's interaction, positive self-image, confidence, accessibility, and allow for learning and development.

Preface and Acknowledgments

This document is a product of a pilot research and development project supported by a Graduate Faculty Research Grant, University of Wisconsin-Milwaukee. The Center of Architecture and Urban Planning Research, and the School of Architecture and Urban Planning Dean's Office provided the project's staff with encouragement and administrative support.

The concept of design principles and some of the specific design guidelines in this report were developed by the first author and his colleagues in several other projects. Papers and reports discussing design principles, their evolution, development, use, and application projects include: Cohen and Moore (1977); Moore, Cohen, and Team 699 (1977); Cohen (1978); Moore and Cohen (1978); Moore, Cohen, Oertel, and van Ryzin (1979); Cohen, Hill, McGinty, and Moore (1978); and Moore, Lane, Hill, Cohen, and McGinty, 1979).

The contributions of these prior and concurrent projects to this project were very important and influenced its approach. Our thanks to all of these projects' participants, and especially to Gary T. Moore and Team 699. Also, our thanks to Stanley Cairens, who assisted us in the preliminary information search.

The overall goal of this project was to identify the basic needs of mainstreaming programs in public schools and to suggest design principles which respond to these needs. This report is a preliminary design guide based on a pilot survey of the issues and needs, and an effort to develop the recommended design responses based on research information compiled from various sources.

As the subject of mainstreaming is still a topic of controversy, and the experience with its applications still too brief, a great deal of testing and examination are still needed to develop better learning environments for handicapped and non-handicapped children.

Milwaukee, June 1979

Chapter 1

INTRODUCTION

THE PROBLEM

Understanding human needs and requirements is essential for informed and sensitive design of environments for handicapped persons. In this regard, the need for collaboration between those who design and those who use and manage mainstreamed education facilities is of very great importance. In order to most responsibly develop these facilities, problems which must be faced and resolved include:

- Developing a means of communication between users and designers.
- Gaining an understanding of the developmental, educational, and social needs of handicapped children.
- Understanding how accomodation of these needs can be supported by administrative programs and by physical design.

Legislative and courtroom decisions during the past few years have affirmed the rights of handicapped children to free, public education, in environments which permit interaction between handicapped and non-handicapped children. In order to comply with "mainstreaming" requirements, educational programs across the nation are being reevaluated and new models of exceptional education are being developed. Newly emerging methods of educating exceptional children in mainstreamed settings require environments which support the objectives of the educational programs and the developmental processes of children.

Approximately 10% of all school age children in this nation experience some sort of handicap and therefore require special assistance beyond regular classroom instruction. If educational programs for handicapped children are to proceed with placement of these children in integrated settings, a vocabulary for modification of regular school environments must be developed. Architectural standards for making traditional school environments accessible to the physically handicapped have long been available. However, physical accessibility is but one of the many issues which must be addressed in developing school environments which satisfy the broad spectrum of needs of handicapped children.

In the past, handicapped children have been educated completely apart from their non-handicapped peers or they have been placed in regular classrooms where teachers have had little experience in dealing with the handicapped and settings had not been designed with the handicapped child's developmental and psychological needs in mind. The frequent result of either situation was failure, frustration, and social isolation.

Those who will design facilities for mainstreaming will confront the task of acquiring the necessary knowledge base. Oftentimes, architects do not have the skills, or time, necessary to make rigorous investigations of the special human and education requirements associated with these facilities.

Educators and administrators often face problems which are similar to those of the designers. While professionally competent, they usually have little, if any, experience with the programming and design of facilities. Furthermore, when the problem involves new, or unfamiliar, special environments, they may have had no extensive experience in the use of such facilities.

A compounding problem is the lack of communication between researchers, architects, and educators. Researchers of exceptional education seldom relate their findings to the design of physical environments. Architects often do not have the time or skills necessary to sift through traditional research reports to draw out significant design and planning implications. The educator is often unable to express educational objectives in a manner that will be understood by architects, and the architect's jargon is often undiscernable to educators.

REVIEW OF EXISTING LITERATURE

A search of existing literature relating to physical design for environments for exceptianal education and mainstreaming confirmed the need for a guide which is more comprehensive, and applicable to design, than those already available.

Most of the available sources provide useful information for dealing with relationships between physical environment and specific handicaps (e.g., the blind, orthopedically handicapped, learning disabled, etc.) (Abeson, Blacklow, 1971; Bayes, Francklin, 1971; Hough, 1971; Bednar, Havilland, 1969; Goldsmith, 1976; Cruickshank, 1977). The limitation of these discussions is that they deal mainly with severe handicap conditions and each deals with a single handicap.

However, environments for mainstreaming must accomodate children with all types and severity of handicaps, as well as non-handicapped children.

Despite the recognition that "physical environment can enhance or inhibit the daily operation of the education program" (Abeson, Berenson, 1970), there are few sources available which relate physical environment to emerging alternative education strategies in the manner that Coates' Alternative Learning Environments (1974) does. Most of the existing design guides still assume a traditional architectural approach to "space/function" programming (Osmond, 1971; Hough, 1971; Aiello, 1976) rather than a developmentally based approach as was attempted by Moore, Cohen, Oertel, and van Ryzin (1979).

A major shortcoming of the few available programming guides and sourcebooks regarding design of environments for mainstreaming is the casual substitution of "barrier-free design" (both conceptually and programmatically) for mainstreaming.

Some sources clearly limit the scope of their discussion to barrier-free design (Bednar, 1977; Goldsmith, 1976). However, as was cited in a recent paper (Cohen, Beer, Cairns, Golden, 1979), there are some sources which

claim to discuss design for mainstreaming, yet still result in discussing "barrier-free" design. One Out of Ten (Molloy, 1974) is an example of a very popular sourcebook which in introductory passages explicitly states that it is "not about architectural standards for barrier-free schools", but rather it is "about the implications of the new laws concerning . . . . alternative methods of educating handicapped children in public schools". However, even the case studies presented in this sourcebook concentrate on examples of barrier-free design.

A plan published by a local public school system (Milwaukee Public Schools, 1977) discusses planned modifications of existing facilities to comply with state and federal regulations regarding mainstreaming. The discussion is entirely limited to issues of physical accessibility. No mention is made of intended actions to accomodate environmental needs of children with other types of handicaps. This is indeed a reflection of the universally overriding concern with the overt issues of physical handicaps, while the remaining majority of handicapped persons and their physical-environmental concerns are not identified nor responded to (Cohen, Beer, Cairns, Golden, 1979).

OBJECTIVES AND PROCEDURE

Objectives of the project were to:

- Describe the range of strategies which have been developed to implement mainstreaming programs in public schools, in accordance with all types of children's handicaps.
- Develop a guide for designers to help them understand the educational and developmental needs of handicapped children.
- Identify implications for design which satisfy educational, developmental, and administrative criteria for mainstreamed schools, and identify critical design principles.

While this document identifies basic criteria for mainstreaming facilities, it is not intended to present all the information required for the unique requirements of each design situation and its setting. In addition, the conventional issues of building design are addressed in a variety of useful design guides and texts on educational facilities and related topic areas.

The design criteria contained in this report are derived from a process of applied research, programming, and design based on our earlier work in this field (see Cohen and Moore, 1977; Cohen, 1978; Moore, Cohen, and Team 699, 1977; Moore and Cohen, 1978; and Moore, Cohen, Oertel, and van Ryzin, 1979).

The process had these basic stages:

- Behavioral observations of children and staff, 45 focused interviews with staff, program directors, and in a few cases with children and parents were conducted at approximately 20 sites.
- Systematic review of existing scientific and professional literature together with our own previous research on the handicapped and child-environment relations, for all relevant findings about the relationship of children's behavior to space and to child-care centers in particular. Included in this review were articles and books in exceptional education, child development, early childhood education, architecture, and environment-behavior studies.

- Identification of significant design issues based on information from these two sources plus our own professional experience and the advice of colleagues.

- Collecting and sorting all the scientific and applied information relevant to each issue into specific packets.

- Development of a central design idea--called a "design principle"--in response to each packet of information, together with the development of more specific criteria and recommendations.

- Organization of the principles into a sequence relevant for planning and design, and preparation of this draft design guide.

The output from this process is a set of 18 design principles for the programming and design of environments for mainstreaming, each with supporting research-based arguments and detailed criteria.

Chapter 2

MAINSTREAMING

HISTORY OF SPECIAL EDUCATION AND MAINSTREAMING

The origin of current philosophies regarding the integration of handicapped and non-handicapped students in education environments, has its roots in the conviction that young children are more alike than different, that all children share certain developmental needs, and that the best way to meet these needs is to serve exceptional children in the same environments which also serve non-handicapped children (Birch, 1974).

From earliest times, handicapped people were excluded from participating in society. Frequently, they were subject to fear, ridicule or even torture (Hewett, 1974). Very little attention at all was directed toward maintaining educational programs for the handicapped. It wasn't until the middle of the nineteenth century that society began to pay attention to the needs of the handicapped. At about this time, institutions were first established to educate handicapped children.

By the early 20th century, special education classes in public school systems began to be established. These classes were created as a result of the advent of compulsory education legislation. Compulsory attendance brought handicapped children to schools where they could not be handled and were not welcome. However, these children, who were previously eliminated from schools, could not be disregarded. Therefore, a movement toward the establishment of separate special classes for handicapped children had begun.

Often the environments of special classes reflected the same dehumanizing attitudes which had previously totally excluded handicapped children from public schools. Walls and floors were designed to be "indestructable", furniture was unmovable, door locks could not be operated by children.

Once established, special classes proliferated. (Bates, West, Schmerl, 1977). They were hailed for their practicality in providing homogeneous groupings. One of the basic assumptions of the special class approach is that children with similar handicap types have similar educational needs. All children

with similar handicaps were thus assigned to the same class without regard to individual academic potential or needs.

The middle of the 20th century has marked a period of renewed societal concern with the problems and rights of handicapped persons. A major result of this concern has been the development of architectural solutions which provide physical access to buildings for physically handicapped persons.

Spurred by legislative mandate, many "regular" education facilities have been modified to become "barrier-free". This allowed for establishment of exceptional education classes in the same buildings as non-handicapped children. This led to side-by-side yet still separate, education systems with little contact between handicapped and non-handicapped children. This approach also failed to recognize that physical accessibility is not a problem for most handicapped children, nor were the legitimate problems of the children taken into concern.

The concept of integration in exceptional education denotes the provision of educational settings which serve handicapped and non-handicapped in ways which are more similar than different. A key goal is to facilitate the possibility of considerable interaction between handicapped and non-handicapped children. Interaction, it is believed, can help reduce alienation and prejudices, expose children to a wider range of personal and learning experiences, help children develop positive self-images toward themselves, as "emphasis of the strengths and weaknesses of all children" helps bring forth the realization that disabilities are "but one aspect of a person's life" (Meisels, 1977).

Since the 1960's, a large number of court decisions have ruled in favor of handicapped children's right to public education along with their non-handicapped peers. Among those which are considered landmark cases are Pennsylvania Association for Retarded Children v. The Commonwealth of Pennsylvania; Mills v. The Board of Education of District of Columbia Public Schools and LeBanks v. Spears of the Orleans Parish (Louisianna) Public Schools.

The court decision in Pennsylvania ordered access to free public schools for all retarded children, regardless of severity of retardation or associated handicaps, and ordered that the education programs provided to all children be appropriate to the individual needs of each child, within the confines of the most integrated, most normalized program possible. In the LeBanks v. Spears case, the court ruled that placement of exceptional children within the regular public school classes, with appropriate support services, is preferable to placement in special, segregated classes.

The right of handicapped children to education within the "least restrictive alternative environment" was established in Wisconsin with the passage by the State Legislature of Chapter 115, in 1965. The federally enacted Education for All Handicapped Children Act (Public Law 94-142), decrees that "each public agency shall insure that to the maximum extent appropriate, handicapped children (including children in public and private facilities) are educated with children who are not handicapped, and that special classes, separate schooling or other removal of handicapped children from the regular education environment occurs only when the nature and severity of the handicap is such that education in regular classes, with the use of supplementary aids and services, cannot be achieved".

The term "mainstreaming" was devised to emphasize the education of "exceptional children within the mainstream of society". The term has become operationalized to refer to the placement of handicapped children in regular classes, with non-handicapped children, at least part of the day, with additional supportive services also provided. The main thrust of mainstreaming has been directed at children with mild problems, who compose the majority of all handicapped children (Reynolds, 1962). Mainstreaming does not mean placement of children with severe disabilities in regular classrooms in cases when such placement would be severely disruptive to academic instruction.

To date, nearly every state legislature in the nation has upheld the rights of all handicapped children to free public education, regardless of type or severity of their handicaps, in environments which, to the greatest extent possible, insures integration of handicapped and non-handicapped children.

MODELS OF MAINSTREAMING PROGRAMS

Mainstreaming, by its nature, requires schools to view students as individuals and to determine students' programs on this basis. This approach stands in contrast to the more traditional special class system where children were regarded as either being handicapped or non-handicapped.

The "cascade" system (Reynolds, 1962) establishes a framework for exceptional education delivery which provides for a variety of teaching approaches in a range of environmental settings. The "cascade" begins by assuming that most handicapped children can be absorbed into regular classes with little change of program. From this base, modified programs and settings are provided to accomodate children who are more severely handicapped.

A corollary to the "cascade" system is the principle of "least restrictive environment". This is to say that within a public school system, handicapped children should be placed where they may receive the most appropriate education while maintaining as much contact as possible with the mainstream of the educational system (Molloy, 1974).

In keeping with the spirit of the "cascade", most school systems have developed programs which provide a range of methods to mainstream handicapped children, relevant to the specific needs of individuals. The most common alternatives to mainstreaming are:

- Handicapped children are educated in regular classes full-time. Periodic visits to the regular class by special teachers to conduct individualized instruction with handicapped children may occur.
- Handicapped children are based in regular classes most of the time. However, children periodically leave regular class for special instruction in "resource rooms".
- Handicapped children are based in "self-contained" special classes. Periodically they join activities in regular classrooms.
- Handicapped children are educated in special classes full-time and join others at lunch, library, gymnasium, and special events.

Chapter 3

THE MAINSTREAMABLE

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WHO ARE THE MAINSTREAMABLE?

Some lack of clarity about mainstreaming extends to the question of who is to be mainstreamed. It is apparent to all that the concept includes those exceptional children traditionally served by the public schools. There is controversy over whether the concept also includes children presently enrolled in county or state facilities outside of the school's dominion. The movements of de-institutionalization and mainstreaming are cut from the same cloth: the right of all children to the best education possible. There is no easy answer to the "who" question, only an opinion: Public schools should evolve into organizations providing individualized instruction for all children, with the mainstreaming concept first applied to the children the schools now serve (West and Bates, 1979). Whatever the level of handicapped severity accepted for mainstreaming programs, it is essential to understand the types of handicaps and thier nature, before establishing the appropriate design responses to accomodate the special needs of mainstreaming.

THE NATURE OF HANDICAP TYPES

In the most general sense, the term "exceptional children" refers to those children whose rate of development or learning deviates from the average to such an extent that special attention is required. The term refers to both the handicapped and the gifted child, though our attention is directed toward children with developmental lag.

Handicapped children may be considered to have one or more of the following disabilities:

- Mental retardation
- Visual difficulties
- Auditory difficulties
- Speech and language impairments
- Emotional disturbances
- Learning disabilities
- Orthopedic handicaps

While many of these disabilities occur exclusive of other disabilities, many appear in combination with each other. In some cases, one disability can influence the appearance of another.

It is important to note, however, that many handicapped children have below average abilities in one specific area and have average or above average abilities in all other areas. Thus, contrary to much belief, many handicapped children are not generally below average or sub-normal. They may not hear or see as well as the normal child, but are normal in all other areas of development. For the majority, the similarities between normal and handicapped children exceed the differences.

MENTAL RETARDATION

The mentally retarded child generally has an IQ below 70 or 80, has subaverage intellectual functioning, and impaired adaptive behavior, i.e., difficulty with sensory-motor skills, learning and social adjustment (Hewett, 1974).

Retardation can be caused by a number of factors:

- Genetic, e.g., Phenylketonuria or Down's syndrome
- Prenatal, e.g., Rubella disease, and according to recent reports, alcohol, drugs, and nicotine
- Perinatal, e.g., brain damage during delivery
- Postnatal, e.g., encephalitis
- Social factors, e.g., a greater incidence of mental retardation in families of lower socio-economic status

Degrees of severity of mental retardation range from mild, through moderate to profound.

Mildly or educably retarded children generally attain 2nd - 6th grade levels in academic achievement. Some may have a physical handicap (e.g., cerebral palsy) accompanying the mental disability. Also characteristic are moderate delays in speech and language (Dunn, 1973). Many mildly retarded children have the potential to get along independently in the community and to become partially or totally self-sufficient economically.

Moderately or trainably retarded children usually learn skills at a first grade level. Most have a physical or sensory impairment and rarely have the potential to live independently. Skill potentials are limited to working in a home, residential school, and most often only in a sheltered workshop.

For profoundly retarded children, on the other hand, the severity of mental retardation and accompanying physical disabilities make the child incapable of self care, socialization or vocational usefulness. These children require complete care and supervision (Hewett, 1974).

VISUAL IMPAIRMENTS

Visual handicaps include complete blindness, where visual acuity is 20/200 in the better eye; partial vision, where visual acuity is 20/70 to 20/200 after all treatment and lenses, and visual defects which can be remedied through treatment and optical aid.

The origins of complete blindness include prenatal causes, poisonings, diseases, and injuries. Partial vision may be caused by refractive errors, cataracts or albinism, muscle function defects, infection and injury (Hewett, 1974).

Children who are completely blind principally read braille. And while many studies show that blindness does not cause developmental disturbances when not complicated by other disorders (Cruickshank, 1971), it may affect mobility, interpersonal relations, and educational achievement.

The effects of partial vision on children are not as great. These children only require some instructional and physical environmental compensations (Moore, Cohen, Oertel, van Ryzin, 1979). Primarily they read large print books or regular print books under special conditions.

HEARING IMPAIRMENTS

The hearing impaired child may either be deaf (no auditory stimulation) or hard of hearing (difficulty hearing anything below 30 to 40 dB).

The cause of his or her disability may be genetic or due to disease or injury (e.g., rubella in early pregnancy). Evidence also suggests that high intensity noise and the mother's misuse of antibiotics during pregnancy can cause hearing impairment (Moore et al., 1979).

Deafness is often irremediable and can affect language and speech. The deaf child may also have balance and perceptual difficulties (A Playground for All Children, 1978). Deafness does not, however, affect intellectual ability when not complicated by other handicaps (Dunn, 1973).

The hard of hearing child is not effected in any of the above-named areas of development. His or her sense of hearing, though defective, is functional with or without a hearing aid (Cruickshank, 1971).

SPEECH AND LANGUAGE IMPAIRMENTS

Children's speech and language impairments take many forms and vary greatly in degree of severity.

Speech impairments include problems of articulation, voice, and stuttering. Language impairments are disorders of oral comprehension and expression as well as deficiencies in reading and writing.

The cause of language disabilities is probably related to a central nervous malfunction. Both speech and language difficulties may be related to a lack of experience due to poor linguistic models in the environment. Hearing difficulties, and association with more severe disabilities (e.g., cerebral palsy, mental retardation) can also account for speech impairments (Dunn, 1973).

While the disability may affect interpersonal relations and social maturity, normally it does not affect general intelligence (Moore, 1978).

LEARNING DISABILITIES

Children with learning disabilities do not have obvious physiological disabilities or signs of mental retardation, but cannot learn specific things in school and home situations. These children are normal in most respects, but have one or more marked, specific learning difficulties (Moore, 1978).

The cause of the disability may be neurological, emotional, or behavioral.

Some of the effects of the handicap include hyperactivity, perceptual-motor impairment, general orientation defects, short attention span, distractability, and difficulty acquiring, processing, and expressing information (Hewett, 1974).

ORTHOPEDIC HANDICAPS

Orthopedic handicaps include a variety of motor and neurological impairments ranging from mild motor incoordination to complete paralysis (Dunn, 1973).

For some children, the disability may be due to the loss of full use of one or more limbs. In this case, the crippling condition does not directly alter the learning abilities of the disabled child.

For other children, the disability may be due to neurological impairments occuring prenatally, paranatally, or postnatally, as in the case of cerebral palsy and spina bifida (Dunn, 1973).

Children with one of these disabilities may simply walk with a limp (e.g., mild cerebral palsy), ambulate with the aid of a leg or knee brace and/or crutches (e.g., spina bifida) (Moore, 1978), or be completely helpless in a wheelchair (e.g., the severe muscle weakness, postural imbalance and excessive involuntary motion of severe cerebral palsy) (Dunn, 1973). The nature of the disability will depend on which of the two conditions the child has and the severity of the particular condition.

In addition, many children with cerebral palsy and spina bifida have secondary handicaps. Most prevalent are defects of speech, vision, and mental retardation (Dunn, 1973).

Neither cerebral palsy nor spina bifida are progressive conditions, and in the case of mild cerebral palsy, the condition can be corrected (A Playground For All Children, 1978).

Also affecting motor stamina or performance but of a physical origin, are other health impairments like congenital heart defects, or rheumatic fever. While these impairments may slightly or severely affect physical activity, they do not affect other areas of development and learning if the child is properly cared for (Moore, 1978).

Pregnant school-age girls may also be considered to have potential mobility problems. For these children, pregnancy can produce some degree of anemia, high blood presuure, and excess weight. There is also a greater incidence of premature births and toxemia among pregnant school-age girls (Dunn, 1973).

INCIDENCE OF DEVELOPMENTAL DISABILITIES

As many as one in every ten children has some form of mental or physical handicap. However, this number represents the cumulative incidence of handicapped children for a fiscal year. Estimates are that 7.5% to 8.5% of all children require exceptional education services at any one time (Blessing, 1978). A breakdown of this figure into handicap types is known for some states, and can be compared with cumulative totals, as shown in Table 1.

A review of Table 1 indicates that speech and language is the most prevalent type of developmental disability; mental retardation is the next most common. Many children formerly listed under emotional disturbances are now seen to have some form of specific learning disability. Percentages in this category can be expected to continue to rise relative to the other handicap types.

TABLE 1:
DISTRIBUTION OF DISABILITIES AMONG ALL CHILDREN

Disability Type	1968 BEH Estimates[a]	1978 BEH Reports[b]
Speech Impaired	3.5%	3.5%
Mentally Retarded	2.3%	2.3%
Learning Disabled	1.0%	2.0%
Emotionally Disturbed	2.0%	2.0%
Hearing Limited	.6%	.11%
Visually Limited	.1%	.06%
Physically Handicapped	.5%	.5%
	10.0%	10.47%

Sources

[a] U.S. Office of Education, Bureau of Education for the Handicapped, 1969; from Kirk, 1972

[b] U.S. Office of Education, Bureau of Education for the Handicapped, 1978; from Blessing, 1978

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Chapter 4

USER BASED GOALS IN MAINSTREAMING

USER-BASED GOALS IN PROGRAMMING FOR DESIGN

Unlike traditional facility programming, which is based on a range of factors such as processes and activities to be accomodated, cost, site considerations, etc., this guide is concerned only with user-based goals. All programming discussions are based on issues generated by mainstreaming objectives, in relations to children and their educational environments. These goals are based also in part on developmental and therapeutic needs of handicapped and regular students.

This approach to programming is a product of the philosophy that the facility has to respond primarily to its users and to accomodate their needs -- not an original idea, but one which gets lost too often in practice.

To accomodate partial or selective design intervention, especially in the case of renovation, users of this and similar guides could use the following set of goals to determine their own priorities for design goals in mainstreaming educational facilities. This can be achieved through group discussion and other techniques, reaching a consensus about the range and rank order of the goals appropriate to each specific situation.

USER-BASED GOALS FOR MAINSTREAMING

The list of the primary user-based goals, identified as the critical issues to be intervened by physical design more responsive to mainstreaming, include:

- Fostering social interaction and cooperation
- Providing for special needs of handicapped children
- Providing variety of learning modes to support cognitive-perceptual development
- Supporting social-emotional development
- Supporting development of self-concept and confidence
- Developing spatial awareness
- Overcoming physical barriers

FOSTERING SOCIAL INTERACTION AND COOPERATION

One of the primary aims of "mainstreaming" is to get children together, emphasizing their similarities rather then their differences.Even partial contact is preferred to isolation.

Partial interaction can be facilitated by distant and passive contact between one group of children and another, e.g. handicapped children in a resource room which overlooks a locus of activity occupied by regular students.

Even though a school might be considered "mainstreamed", with places for social interaction, the handicapped child may feel out-of-place, uncomfortable, and the subject of stigma. The physical set-up, may be a contributing factor to these negative attitudes. If the environment "says" that certain places are restricted, or different, those using it acquire similar labels. By isolating special instructional areas from the rest of the instructional areas, treating a special area differently-with hard surfaces, and bars on the windows -, the environment begins to indicate and emphasize differences. Such physical areas must be avoided if the mainstreamed setting is to be a place of interaction and understanding. Attitudes towards the handicappped may be the toughest barrier to overcome in mainstreaming. More positive attitudes should be encouraged.

PROVIDING FOR SPECIAL NEEDS OF HANDICAPPED CHILDREN

One of the stumbling blocks in resolving negative attitudes towards mainstreaming is the "...lack of knowledge and experience most people have regarding handicapped individuals..." (Cook, Morris, 1977). Critical to the success of mainstreaming is information disemination to "raise the consciousness of the general public regarding the existence and needs of handicapped people." (Cook, Morris 1977). "...several studies reviewed by Harth (1973) indicate that when teachers and

medical personnel learn about handicapped people and their conditions they are more willing to accept the handicapped." (Zand, 1977)

In addition to a structural informational program for adults, exercises in "putting yourself in someone elses' shoes" can be very enlightening, particularly for the children. When school programs and facilities are shared, children may better understand each others needs.

PROVIDING VARIETY OF LEARNING MODES TO SUPPORT COGNITIVE-PERCEPTUAL DEVELOPMENT.

Within any education setting children will be developing and learning at different rates and different means will be successful. This is particularly true in the mainstreamed setting, where, for example, the blind child will approach a subject differently then the average child. It is important then, that the necessary learning situations and activities are provided for and explored with each child. The physical setting should therefore accomodate a variety of learning spaces (group sizes), and be filled with the whole range of stimuli, so that each child's mode of discovery is satisfied.

SUPPORTING SOCIAL-EMOTIONAL DEVELOPMENT

Social-emotional development requires opportunities for emotional release and environment which fosters emotional security.

Children develop emotionally by learning to handle and communicate their feelings. (Moore, Cohen, Oertel, Van Ryzin 1979) The exceptional child is likely to encounter emotional difficulties, particularly related to their handicap. The autistic child, for example, may experience anxieties and fears over entering a new group situation. Another child might experience frustration with tasks that are not easily accomplished. Another might need extra assurance that their environment won't change abruptly.

All these cases pose a hindrance to healthy emotional development. They should be considered when organizing the physical environment. For example, there should be places for groups to interact, with places for others to observe, safe from the confusion of the crowd. Other children, when overcome with fears, or simply exhausted from activities, need a place to retreat to and recharge. The environment should also communicate stability and continuity, and a certain amount of predictability.

SUPPORTING DEVELOPMENT OF SELF-CONCEPT AND CONFIDENCE

Children with developmental lags, whatever their type or case, need to develop a positive self-concept - one of the most important developmental goals for exceptional education. (Moore, Cohen, Oertel, Van Ryzin, 1979) Children also need to feel confident and comfortable manipulating their environment. That confidence will develop from successful interactions within the social and physical environment. A positive self-concept stems from a good feeling about themselves in their setting, their growth, and discoveries.

"Any supporting environment...must be designed to provide success..." (Moore, Cohen, Oertel, Van Ryzin, 1979), through grades challenges, providing alternative ways to accomplish a task, and points where successes are made clear.

DEVELOPING SPATIAL AWARENESS

Development of spatial awareness is particularly critical for the exceptional child who is limited in a perceptual sense or physical ability. It is important that children understand their environment, that it is easily comprehended. Understanding of where they are in space, their body position, "is developed through repeated experience of moving in space with appropriate labeling of locations and relationships." (Piaget, Inhelder, 1956). A clearer understanding is also supported by "the opportunity to (experience) things from varied perspectives." (Moore, Cohen, Oertel, Van Ryzin 1979). There should be

opportunities to experience spaces from different levels, and to experience different intensities of stimulation.

Because some "exceptional children are easily confused, it is necessary to provide an environment that clearly defines separate activity areas. Environmental cues should also be provided to assist the child in locating himself or herself in space". (Moore, Cohen, Oertel, Van Ryzin, 1979)

Children should be able to affect their environment, to make changes and experience the result. This interaction becomes a very direct learning experience, and can aid in better orientation and appreciation of their space.

OVERCOMING PHYSICAL BARRIERS

Naturally, for any of the above to occur adequately the environment must have provisions for the physically disabled. For social interaction to happen in the first place, the children must physically be able to get together. Anything that hinders the child's movement, or sense of orientation, can make the school an awkward, uncomfortable place.

Chapter 5

DESIGN PRINCIPLES

DESIGN PRINCIPLES: AN APPROACH TO PROGRAMMING AND DESIGN

An important part of any user-based programming for building design is the articulation of basic goals or issues to which the designed environment should respond. These issues should be generated from the basic purpose of the facility, e.g., education and socialization of children. This global goal is then branched out to broad, inclusive goals such as motor, cognitive, and social-emotional development. The list then continues with specific goals such as eye-hand coordination.

A closely related way to organize programming for design is to identify important user-relevant issues, e.g., the need for graded challenge in the environment. These issues become the target for intervention by design.

Our approach is to respond to both methods by design principles. These principles suggest critical environmental factors and characteristics of those settings which will facilitate the goals or resolve the issues. As developed in the last few years, design principles are intended to be abstract, general, evocative, and suggestive of a range of design options. Architects always use design concepts, like "this central spine". But these concepts are seldom behaviorally-based, they most often are very few in number, and they are very seldom evaluated or even questioned seriously. The notion of design principles advanced here are much like that of Alexandrian patterns (Alexander, Ishikawa, and Silverstein, 1977) in that they are behaviorally-based, argued on the basis of serious problems and research literature on those problems, are several in number, and are testable. But Alexandrian patterns are often criticized as being too concrete, specific and dogmatic. An attempt was made to communicate information which would provide specific direction and information suggestive of a range of design solutions, and thus which would stimulate the designer's imagination and intuition while avoiding overly doctrinaire and absolute solutions that might inhibit design innovation.

DESIGN PRINCIPLES FOR MAINSTREAMING

The following design principles were developed as a response to the user-based goals outlined in the previous chapter. A detailed discussion of each principle follows this list.

- Settings That Are Not Noticeably Different
- Common Entry and Circulation
- Linked Activity Areas
- Orderliness and Consistency*
- Repetition and Multiple Coding *
- Range of Environmental Stimuli*
- Barrier-Free Design
- Predictable Settings and Events
- Unobtrusive Observation
- Public Display of Accomplishments
- Variety of Teaching Areas
- Settings for Simultaneous Activities
- Individual Work Areas Within Larger Settings
- Retreat Areas*
- Resource Rooms For All Children
- Places For Informal Socialization
- Manipulable Settings
- Personal Territory and Self-Expression

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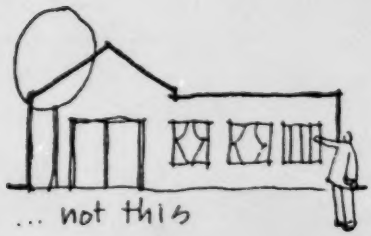
* These principles were adopted from Designing for Handicapped Children (Moore, Cohen, Oertel and Van Ryzin, 1979), and from Recommendations for Child Play areas (Cohen, Hill, McGinty, and Moore, 1979).

SETTINGS THAT ARE NOT NOTICEABLY DIFFERENT

ISSUE

Modifications of buildings for handicapped children have often resulted in spaces or equipment which are noticeably different from ordinary settings. These features reinforce negative stereotypical attitudes about the handicapped among other children.

DISCUSSION



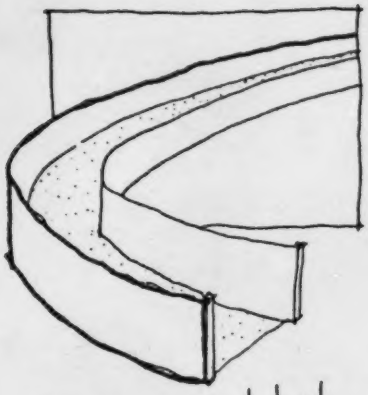
Frequently the aspects of schools which have been adapted for use by handicapped are so obviously different from ordinary physical features of buildings. These spaces and apparatus are not attractive for use by non-handicapped persons. Areas where modifications for handicapped have been made, other than standard "barrier-free" compliance, include "indestructable" wall and floor finishes in special "self-contained" rooms, removal of decorations to avoid unintended stimuli and adapting knobs and switches for the beneift of children with fine motor control problems. In some extreme cases, bars have been placed on windows of handicapped rooms. In these cases, the changes are so visible that they allow viewers to make predicitons about the activities and character of the people kept behind the bars. These assumptions lead to growth of perceptions which effect how handicapped children are viewed and treated by others, and eventually how they act and feel about themselves (Wolfsenberger, 1977).

PRINCIPLE

When it is necessary to make changes in school environments to accomodate handicapped children, the modified spaces and equipment should be usable by, and attractive to, all people.

RECOMMENDATIONS

- Exterior appearance of schools should not overtly indicate which areas of the building are for the exclusive use of the handicapped.
- Interior and exterior of handicapped areas should maintain basic architectural style and expression of the rest of the building.



Ramp as sculptural element

- Materials, finishes, windows, etc., in exceptional education areas should be the same as those used in the remainder of the school.
- "Barrier-free" hardware should be attractive to, and usable by, all people.
- Ramps can be designed as sculptural elements which serve as major circulation paths for all people in the school.

COMMON ENTRY AND CIRCULATION

ISSUE

A common entry and circulation for all children is the place to start mainstreaming and reducing the stigma associated with being different and requiring special facilities and separate entry points.

DISCUSSION

At many schools the separation of handicapped and regular children happens before the school day begins: at the entrance. Due to problems of physical accessibility, or the location of exceptional educational facilities in remote areas of the school, handicapped are required to enter school buildings through separate doorways. Separate entrances are often followed by separation of circulation; back stairs, special wings, etc.

"The circulation design establishes the order, organization and functioning patterns of the school...the circulation ways provide an opportunity for stimulating learning, socialization and functioning pattern and physical experiences" (Hough, 1971). By denying handicapped children the opportunity to move throughout the building in the same way as other children, an important opportunity for interaction is also denied. The child brought in the back door is socially isolated and susceptible to stigma.

PRINCIPLE

There should be a common entry for all students which is part of a circulation system that is usable by all and connects the entire school building.

RECOMMENDATIONS

- Entries should be usable by all children.
- Provide a common bus pull-up and drop-off point.
- When ramps and elevators are provided, they should be usable by everybody, and located adjacent to other circulation systems.
- Special areas should not be grouped "in the back", but organized along the building's common circulation path.

LINKED ACTIVITY AREAS

ISSUE

The different activity zones of schools should be linked physically and conceptually so that it is clear that exceptional programs are as much a part of the school curriculum as any other activity.

DISCUSSION

In many schools which have been adapted to accomodate exceptional education and mainstreaming, special class zones have been established in basements, ends of wings, or specially constructed annexes. As discussed in Settings for Simultaneous Activities, it is desirable to conduct exceptional education programs in the same environments where regular classes take place. It is recognized that under certain circumstances it may be desirable to work with children in more private settings. However, the extreme separation of exceptional education rooms leads to unawareness of the nature of educational programs for handicapped children (Abeson, Blacklow, 1971).

The forced, and often obtrusive, movement of mainstreamed children from regular to exceptional classes heightens awareness of the differences of the handicapped, which is contradictory to basic mainstreaming objectives. Movement through the school building is difficult for many handicapped children, and may result in added frustration (Bayes, 1967).

PRINCIPLE

Cluster regular and exceptional activity zones so that they are linked conceptually as well as physically. Eliminate the necessity for children to move through long, undistinguished corridors from one activity to the next.

RECOMMENDATIONS

- Achieve conceptual connections between activity areas by keeping them closeby and convenient to each other.
- Movement between activity zones should be through informal meeting grounds which are familiar and friendly places.
- Use graphic symbols to identify activity areas, for ease in orientation.

ORDERLINESS AND CONSISTENCY

ISSUE

Handicapped children are often confused and disturbed by environments which are overly complicated and ambiguous.

DISCUSSION

Many exceptional children, particularly those with emotional and learning disabilities, have perceptual difficulties. Exposure to excessive environmental stimuli may cause frustration or even throw these children into a hyperactive state (Cruickshank, 1967). The architectural elements in a school which may be confusing to exceptional children include: highly rhythmic patterns, clashing color schemes, suspended building elements which appear to defy gravity, unclear connections between mechanical systems and control switches, ambiguous relationships between indoors and outdoors....(Bates, 1971). A high degree of orderliness and consistency may reduce irrelevant stimuli and resultant frustration and hyperactivity and therefore increase suitability of these environments for learning.

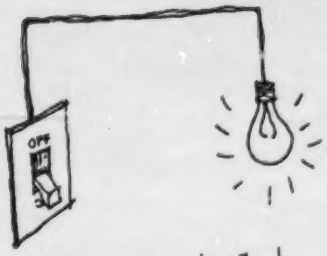
Applying this notion to exceptional children suggests that school environments should be subdued. However, in mainstreamed schools, the same environments are to be used by handicapped and non-handicapped children. If environments are too subdued, they would then begin to leave out variety and become boring for those who are not handicapped.

PRINCIPLE

School environments should be orderly and consistent so that they do not confuse exceptional children, yet they should not be so subdued that they lack interest for regular children.

RECOMMENDATIONS

- Have focal points with a range of environmental stimuli within each classroom.
- Reduce irrelevant stimuli in "common" or public portions of schools.
- Doors should generally swing the same way.
- Locks, latches, switches should be consistent and easy to operate.



Show cause and effect relationships.

- Avoid use of fake materials which do not feel or behave like real materials.
- Disclose relationships between mechanical systems and control sources to demonstrate cause and effect.
- Do not eliminate environments which are intriguing, novel, or complex.

REPETITION AND MULTIPLE CODING

ISSUE

For some children, information may have to be repeated several times, in a variety of ways, for them to fully comprehend the message, and to keep interested in learning.

DISCUSSION

The exceptional child needs more than the usual amount and range of stimuli and repetition in his environment, to compensate for perceptual and/or learning difficulties the child may experience. Cues may have to be repeated several times over to help an exceptional child grasp a message. This "repetition...helps maintain the child's interest in learning. It also helps the child achieve generalization, and thus apply newly learned information to other situations" (Moore, Cohen, Oertel, Van Ryzin, 1979).

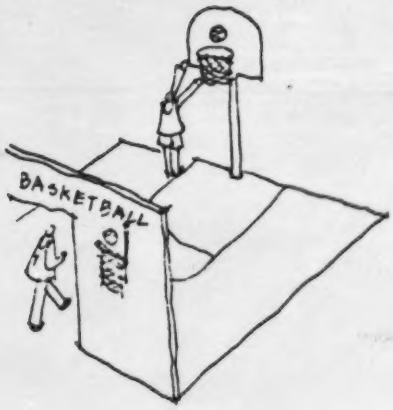
It is also important that information be directed towards all the senses. This is multiple coding--the use of several cues (color, shape, texture) to identify an object or space. This multi-sensory communication can deliver concepts and information in a variety of ways, with one sense reinforcing the other. "Multiple coding is important to cognitive and perceptual development, because every element, or group of elements is coded, explained, and explains in a variety of ways, the child's awareness, vocabulary, and mental capacity are expanded (Moore, Cohen, Team 699, 1977).

PRINCIPLE

Develop a learning environment that is rich with information for all the senses. Multiply code spaces and objects by color, shape, texture, etc., and use repetition of cues and elements to help children grasp concepts and ideas, and learn to generalize.

RECOMMENDATIONS

- There should be a planned amount of redundancy, repetition and reoccurence of space types. (Moore, Cohen, Team 699, 1977)
- When using numbers, words, colors, textures, shapes, etc., provide as many ways as possible to relate the same idea or meaning. (Moore, Cohen, Team 699, 1977)



- Color and numbers should be used in an integrative way to reinforce what is already inherent to the environment. (Moore, Cohen, Team 699, 1977)
- Shapes, colors, textures, and designs should be repeated in different, moderately complex ways. (Cratty, 1974)

PUBLIC DISPLAY OF ACCOMPLISHMENTS

ISSUE

Recognition of children's accomplishments and successes can help them to develop confidence and a positive self-concept.

DISCUSSION

Handicapped children's frustrations in handling tasks that their peers do with ease may affect their performance in other areas of development. The child may exaggerate his difficulties and feel inadequate, when in actuality he is capable of accomplishments in many other areas. It is important that children take pride in small things, and are encouraged by special, personal accomplishments. In order to do this, the child's successes need to be more apparent than his failures. Each step the child takes in his own personal development should be obvious.

PRINCIPLE

Provide places and times where good work and other accomplishments can be displayed and discussed.

RECOMMENDATIONS

- Provide the opportunity for immediate display, convenient to work areas; tack space, shelves, etc.
- Clearly identify work with the student responsible.
- Set up a changing display area in public parts of the school to present good work by students to visitors, teachers, and other children.

Chanas for immediate display

INDIVIDUAL WORK AREAS WITHIN LARGER SETTINGS

ISSUE

Handicapped children should have the opportunity to receive personal instruction, work independently or briefly retreat without completely removing themselves from the regular classroom.

DISCUSSION

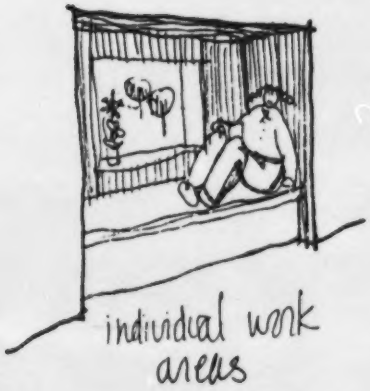
Most of the previous thought on the issue of individual work areas stresses the value of privacy for development of personal and mental well-being (Moore, Cohen, and Team 699, 1977; Whalen, Flower, Fuller, Jernigan, 1975; Bayes, 1971). Recommendations for designing individual places stressing the most stringent aspects of privacy have called for solid walls and doors, sound insulation, and physical isolation. These recommendations do not take into account the fact that amounts of desired privacy may often not require absolute seclusion (Wolfe & Caufer, 1975). Furthermore, over-frequent removal of handicapped from the regular class to private, secluded areas calls undue attention to the social needs and problems of these children. Cohen, Hill, et. al. (1978) show that children like to be alone at times yet still be able to observe others. This, of course, is precluded by complete seclusion.

PRINCIPLE

Places appropriate in scale for use by one child, or child and teacher, should be created within the regular classroom.

RECOMMENDATIONS

- Change the scale to indicate a more intimate place within a larger setting, through change in ceiling height, a loft space, a level change, etc.
- Define a place "big enough for two", with movable partitions, and screens to create privacy.
- Individual work areas should be physically and visually accessible from larger class areas.



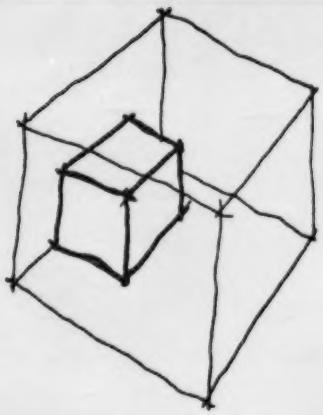
RESOURCE ROOMS FOR ALL CHILDREN

ISSUE

Maintaining "Resource Rooms" which are exclusively used by handicapped identifies these spaces, and its users, as being different and leads to growth of stereotyping and stigma.

DISCUSSION

In most mainstreaming situations, some areas are reserved exclusively for remedial instruction of handicapped children. These areas are usually called resource rooms. Frequently, resource rooms serve as "home rooms" for handicapped children. This is where they are based and the bulk of instruction takes place. In this sort of arrangement, handicapped children venture out of resource rooms to join other children only for specific activities at designated hours.



Resource room within larger instructional area

A sense of mystery may become associated with these areas because they are kept unknown to most children. This sort of mystery eventually leads to the development of stigma and the reinforcement of negative stereotypical images. These attitudes are difficult to change. However, if children are given opportunities to "put themselves in someone else's shoes," they can become more sociable, and understanding of each other (Gottman, Gonso, & Rasmussen, 1975).

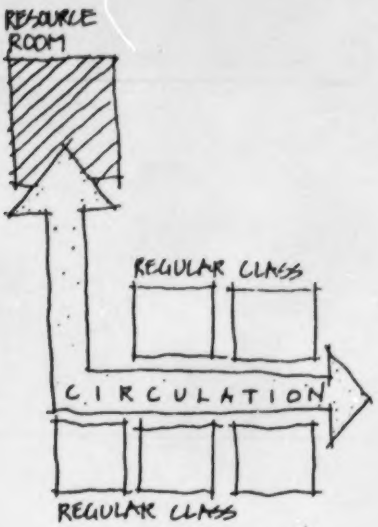
If the resource rooms were occasionally available for use by all children. The stigma associated with "being different" would be reduced and all children could gain broader understanding about the needs of each other.

PRINCIPLE

Provide instructional materials and apparatus in resource rooms which would be useful to all children. In this manner, the process of moving handicapped children to regular classrooms from resource rooms would occasionally be reversed.

RECOMMENDATIONS

- Locate resource room in close proximity to classroom areas.
- The resource room could remain a specially defined space, or become part of a larger, common instructional area.



- Double-function apparatus and learning materials to make them suitable and interesting for all children.
- Provide screens or movable partitions to achieve visual privacy, when desired.

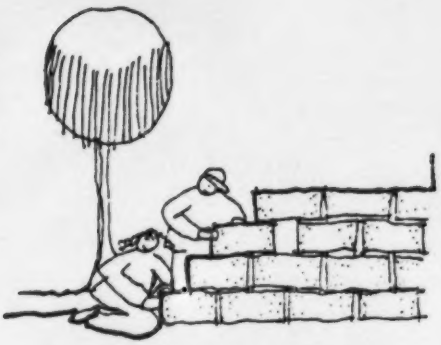
MANIPULABLE SETTINGS

ISSUE

Providing children with opportunities to positively effect the environment contributes to the development of their self-concept and independence.

DISCUSSION

"The physical world surrounding children is usually determined by adults;...There is rarely an opportunity for children to make their own decisions about the environment they live in, learn in, play in" (Madeja, 1974). The child, given an opportunity to manipulate their own environment and effect a noticeable change, is rewarded with a sense of accomplishment. Through effecting changes in their environment and experiencing the results, the child can learn a sense of responsibility and accomplishment. A child is able to make decisions and see them through.



Manipulating their own Environment

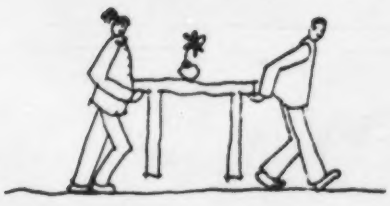
A manipulable environment can be adjusted "to the functions they (the children) wish to perform...the children structure the space in which their experiences take place..." (Ispa & Matz, 19), taking interest in the changes and responsibility for their actions. Through this special responsibility grows a feeling of independence, that they are important people too, and that their environment can become much more responsive to their needs if they take action.

> A good room arrangement can help provide children with the message that they can make decisions about what they are going to do and how they are going to do it. (Ispa & Matz, 19).

PRINCIPLE

Allow children the opportunity to manipulate and make decisions about their own environment.

RECOMMENDATIONS



- Furniture should be movable, and room arrangements flexible.
- It should be possible for the children to effect changes upon and individualize the physical space. Let them paint a wall, or even move it.

Let's Mural!

- Increase children's involvement in decisions and actions about their space.
- Provide places for large group involvement, such as a wall mural or a class garden.

PREDICTABLE SETTINGS AND EVENTS

ISSUE

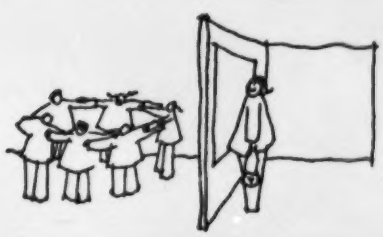
For some children it is critical that they know what to expect from a situation, before entering and abruptly encountering a change in activity and behavior.

DISCUSSION

"The most demanding time and place that must be dealt with by the handicapped child occurs with their arrival at school in the morning and entrance into a classroom" (Hewett, 1974). Entrance into a new area is accompanied by a change in activity and in expected behavior. Some children have difficulty understanding that different rules and expectations accompany different activities. The child should be given the chance to recognize and prepare for such changes, to see beforehand what activities are taking place and what behaviors are expected.

Remoteness

observe without entering



Knowing what is expected is especially critical for places of casual encounters and large gathering places--the library, gym, lunchroom--where the child takes initiative to enter and interact. Fear of the unknown may be enough to discourage the child from participating.

The entrance transition also involves the expected relationships once inside. "It is important that the child, when entering a space, encounters the relationship that he (she) has grown to expect . . . . reducing the frequency and intensity of undesirable confrontations" (Bayes, Francklin, 1971). This is critical for handicapped children; particularly blind children who orient themselves by tactile means, and emotionally disturbed children who need a slower introduction to change and will have difficulty accepting sudden interruptions in routine.

RECOMMENDATIONS

- Provide view into activity before entering.
- Provide a place to stop and scan and make a decision about entering.
- Orient activities inside away from entrance, to avoid face-to-face confrontations.
- Maintain a degree of consistency and predictability in identification and orientation of rooms.

RETREAT AREAS

ISSUE

Handicapped children in a mainstreamed setting may occasionally need to get away and be by themselves for a while in order to regain self-control or confidence when faced with overly intense, or too challenging situations.

DISCUSSION

Provision of breakaway areas allows handicapped children the opportunity to be alone in order to come to terms with themselves and the situations which trouble them. Frequently, handicapped children in mainstreamed classes are involved in situations which may be too intense or stimulating, which can cause frustration, fear, or panic. Assigned tasks may be too difficult to successfully complete and feelings of embarrassment, contributing to poor self-concept, may grow out of the repeated failures. Allowing the child to make a face-saving exit may be of assistance in allowing the child to maintain positive self-concept (Moore, Cohen, and Team 699, 1977). A usual approach to this problem at centers for exceptional education has been to send children to "time-out rooms" which are physically, visually, and acoustically isolated from the remainder of the school.

Use of this practice in mainstreamed schools, however, may present several problems. The removal of handicapped children to places which are unseen and unknown of by the other children might result in an unintended mystique attached to the retreat areas, and may add to the exaggeration of the differences of the handicapped, which leads to the development of stigma. Some prior studies have shown that even when children wish to be alone, they still prefer to watch the others (Cohen, et al., 1978) Furthermore, many school systems require adult supervision of children at all times. In public schools, additional staff would be required for supervising children in time-out booths.

PRINCIPLE

Small, sheltered spaces should be provided adjacent to the regular activity areas in order to allow children to temporarily separate themselves from the larger group in order to obtain relief from potential failure, anxiety, or overstimulation. These spaces should maintain some physical and conceptual connection with the activity setting.

RECOMMENDATIONS

- Breakaway areas should be connected to the large group area to permit children to get away but still be able to watch the class if desired and also be within the range of teacher supervision.
- Retreat and breakaway spaces should double-function as library, music-listening, or "sound" rooms. This would demystify the spaces as they would, at times, be used by all children.
- Retreat areas should offer sufficient privacy and be free from excessive stimulation to allow children to regain self-control and confidence.
- Retreat areas located in places where the children can leave the focus of the group activity, without interrupting the group, or crossing their field of vision.

PLACES FOR INFORMAL SOCIALIZATION

ISSUE

Children learn a lot about each other through interactions which take place under informal circumstances. Children should have opportunities to get to know each other while at school without interactions governed by formal educational programs. Additionally, overt adult supervision can, at times, disrupt interaction among children.

DISCUSSION

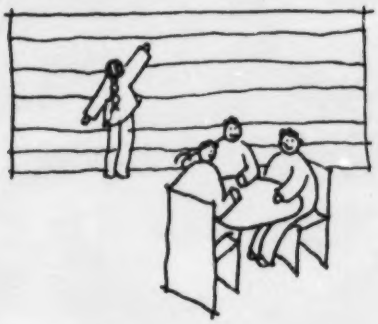
A primary goal of mainstreaming programs is to foster interaction and understanding between handicapped and regular children. Because of spatial and programmatic constraints, interaction at many schools is restricted to specified time periods for designated academic activities. Other opportunities for contact between handicapped and regular children are often very limited, even at lunch or play. Although handicapped children may eat in regular lunchrooms, they are often at separate tables. Frequently, contacts in play areas are limited because of restrictions placed on the handicapped's play or handicapped children use separate sections of play areas because they enter and leave different parts of the school building. In studies of children's play, it was found that informal settings allow children to interact more freely and simultaneously. Direct adult presence can shatter the ambience needed for informal child socialization (Moore & Rose, 1976).

PRINCIPLE

Provide areas which are thought of as "informal" territories where children have the opportunity for spontaneous interaction.

RECOMMENDATIONS

- Within larger classrooms, have commons areas which are not normally used as places for structured learning.
- Provide tables and places scaled for small groups of 2-6 people.
- Have a major non-class activity, such as the library, serve as a building focal point and meeting place. Access should be easy for all children.



- Within libraries, lunchrooms, etc., develop spaces for small groups; by change of scale, providing a sense of enclosure, different lighting levels, etc.
- All children should actively share gym, lunch, and play areas.

RANGE OF ENVIRONMENTAL STIMULI

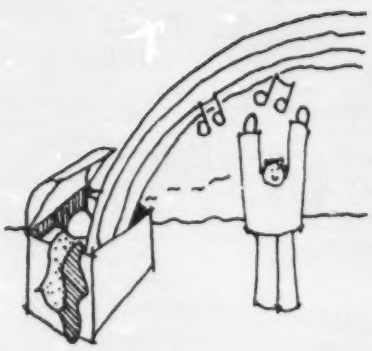
ISSUE

It is important that each person can participate in an environment that is stimulating and meaningful, without being overwhelmed. But different levels of skill, perceptual, or emotional handicaps may make an environment that is clear and interesting for some, a confusing and ill-defined place for others.

DISCUSSION

Developing an environment rich in stimuli and appropriate for everyone is a difficult task. But if handicapped children are to receive the maximum care in design considerations, one must realize what sorts of environmental stimuli they need, in some cases more developed than the average child's needs. For a perceptually impaired child, the "everyday" place cannot be simply understood and comfortably navigated without additional help. The visually impaired child needs the stimulation of the remaining sensory modalities to learn orientation and spatial organization. This can be achieved through the use of sounds, tactile cues, smells. For the completely blind, spatial depth can be judged by the use of time, the pacing off of spaces. The visually impaired child needs direct, multisensory experiences in a variety of modes to learn concepts.

The child with a hearing loss "will rely largely on visual stimuli for learning about their environment" (Mainstreaming children with hearing loss, pg. 50). The deaf child "periodically looks up from his toys in order to scan the environment and assure himself that changes going on around him are not threatening. This matter of environmental change is of critical importance for deaf children..." (Hewett, 1974).



For the mentally retarded child, cautions should be taken against offering too many alternatives, where the child may run from activity to activity never really learning from any single experience. Yet in offering activities for the retarded child, contact with the environment should be made simultaneously through looking, listening, touching and moving. Through this multi-sensory stimulation, "we can expect a greater probability of learning to take place" (Hewett, 1974). A child with learning disabilities

can also benefit from "increasing the stimulus value of the element to which the child's attention is to be directed" (Hewett, 1974). Though a richness and complexity of environment is often beneficial, there should be a clarity of certain physical properties. "The direct connection between cause and effect should always be made easily apparent" (Bayes, Francklin, 1971), that the light switch turns on the light, that water and sun make plants grow. "To avoid confusion, materials which stimulate others are to be avoided" (Bayes, Francklin, 1971).

All children can benefit from an awareness of the rhythms of nature; the rising and setting sun, the change of seasons, the passing of time.

Hyperactive children will have a negative response to too much stimulation, particularly if the stimuli are complex, difficult to recognize and sort.

PRINCIPLE

A rich, stimulating environment can benefit the basic abilities of all children, especially if such stimuli are direct and meaningful, used to express the nature of environment. Ensure a range of stimuli from simple, bold forms with a limited message, to a place filled with sounds, smells and textures.

RECOMMENDATIONS

- Provide solutions which employ stimuli for all the senses--visual, auditory, tactile, etc.
- Use multiple cues for orientation and organization--the use of signs, colors, level changes, to enhance understanding.
- Encourage encounters with natural elements to teach physical properties--cause and effect and nature's cycles.
- Increase stimulus value of elements to which the child's attention is to be directed--by emphasizing with color, exaggerated size, a noticeable texture, etc.
- Allow for control of stimuli--the possibility of limiting variables to reduce complexity and confusion.

SETTINGS FOR SIMULTANEOUS ACTIVITIES

ISSUE

Obtrusive movement from one activity zone to another for special instruction tends to intensify awareness of handicapped children. This tends to lead to stigma associated with the handicapped and to growth of poor self-concept on the part of handicapped children due to feelings of not really belonging to any place or group.

DISCUSSION

Even in "open classroom" school which do not divide buildings to distinct areas for most activities, resource rooms for exceptional education are designated. Movement from one activity area to another by the handicapped is often obtrusive and disruptive to interpersonal relationships among children. In mainstreaming situations, the strength of interpersonal relationships among handicapped and regular children depends on the ability of the handicapped to move easily and unobtrusively from one area to another (Bayes, 1971).

A key element of many mainstreaming programs is the absence of arbitrary scheduling. This allows each child to work on different tasks at different rates of speed, in open classroom type situations. An important concept related to scheduling in open classrooms is called "the integrated day" (Taylor, 1971). This term refers to simultaneous activities taking place in a classroom which overlap spatially and temporally. This allows all class activities to be regarded as integrated into the whole of the class experience. In mainstreamed classes, special programs for handicapped can be conducted without undue attention attracted as these programs would be conceived of as part of the integrated class activities.

PRINCIPLE

Allow for different activities, including exceptional education, to occur simultaneously within regular classrooms.

RECOMMENDATIONS

- Have several focal points within a room to allow simultaneous activities to occur in semi-private spaces.
- Designate circulation zones which permit children to move easily and unobtrusively between activities.

- Focal points should be easy to enter without intruding or confronting others engaged in semi-private activities.
- Focal points should be semi-fixed locations to give needed sense of structuring to some handicapped children.

BARRIER-FREE DESIGN

ISSUE

Since children who are physically handicapped have the same educational needs as able-bodied children, it is obvious that restricting or barring them from activities by creating--or not eliminating barriers in access, circulation, and equipment amounts to stunting their development beyond the problem their handicap may imply.

DISCUSSION

Children who have a handicap must be allowed and encouraged to develop as normally as possible, and to do this they must have access to all opportunities other children have. Further, they must have access to other children, both handicapped and able-bodied. Research reported in Alexander, Ishikawa, and Silverstein (1977, pp. 334-343) has shown that a child's peer group may be even more important than their parents to healthy emotional development. This is especially true for handicapped children.

While not a developmental argument, one very compelling reason for creating a barrier-free environment is that it is required by law.

PRINCIPLE

Barrier-free environment

RECOMMENDATIONS

- Use ramps instead of, or in conjunction with, steps for children in wheelchairs or with braces, crutches, etc.
- Circulation paths should be of a continuing common surface; steps and/or abrupt changes are to be avoided; they should be 5'0" wide to allow wheelchairs to pass; and gradients should not exceed 5%.
- Ramps must not have a slope greater than 1'0" of rise in 12'0" of run, and should be a nonskid surface; width should be 4'0" at least; all ramps must have handrails on each side to fit children's reach, about 16"-24" above ramp. When appropriate, two parallel handrails should be used.

- All stairs should have rounded nosing; riser 5-3/4" and tread 14"; handrails should be of the height described in the preceeding recommendation.

- Children should be able to easily move from the indoor activity area to transportation pick-up points.

- Use signage with raised letters at a height children can reach. Both handicapped and able-bodied children will benefit from this.

VARIETY OF TEACHING AREAS

ISSUE

Approaches toward teaching in mainstreamed settings vary in order to accommodate different situations. Different teaching strategies are used according to subject matter and objectives. Teaching strategies also vary in accordance with the types and severity of handicaps being dealt with. Large, open classrooms are not always suitable for supporting teaching objectives or the needs of children.

DISCUSSION

Many teachers have become oblivious to teaching environments, or say that the spaces in which they teach do not make any difference. It is suspected, however, that these statements are due to feelings that teaching spaces are predetermined and not modifiable (Blacklow, 1971). One study indicated that teachers believe that their effectiveness would improve if they were given the opportunity to manipulate scale and usability of teaching space (Abeson, Blacklow, 1971).

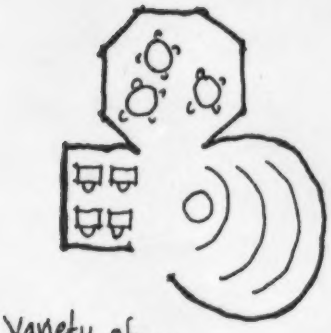
In mainstreaming, it is desirable to keep handicapped and regular children together as much as possible. It is suggested in other design principles that handicapped instruction be conducted in the same areas as regular teaching as much as possible. However, there are circumstances when teaching handicapped children in close, intimate areas can contribute more to teaching effectiveness and children's emotional security.

Many emotionally disturbed and mentally retarded children need to retain a sense of enclosure in order to feel secure. Large classrooms are sometimes ineffective for working with these children. These spaces may be too big, too open, or have too much activity (Bayes, Francklin, 1971).

PRINCIPLE

Within each school, provide a range of sizes of teaching areas. In addition to large classrooms, provide smaller spaces for groups or intimate areas for individual instruction.

RECOMMENDATIONS



Variety of
forms
sizes
functions

- Have at least 3 sizes of teaching areas: classrooms, small group/seminar areas, private instruction areas.
- Allow for movable partitions to create designated temporary small-scale spaces within larger rooms.
- Use corners of classrooms for individual instruction.

PERSONAL TERRITORY AND SELF-EXPRESSION

ISSUE

Exceptional children often have poor self-identity because of slow development of their abilities to make and exert personal choices.

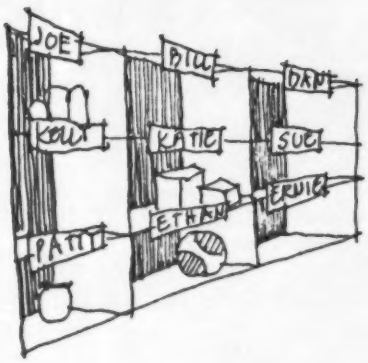
DISCUSSION

In most classroom situations, a traditional governing principle is that individual desires and preferences must conform with class standards. A typical problem among handicapped children is poor development of their self-concept and self-identity (Bayes, Francklin, 1971). Therefore, it is important that each child be given some area or object which they may establish territorial defense over (Hall, 19). Giving each child something which becomes "their own" encourages them to assert personal choice over how their territories are to be used, arranged, and decorated. This results in increasing children's awareness of their individuality and growth of their self-concept and self-esteem.

PRINCIPLE

Provide opportunities to claim and maintain personal "territory" or objects which are to be recognized as belonging to particular individuals.

RECOMMENDATIONS



- Provide places in the classroom which children can establish as their personal territories and be used for individual work, meditation, or retreat.
- Individual cubicles or closets should be provided for children to store and display personal objects.
- Individual pin-up boards can be used to display good work, drawings or any other items which a child thinks relates his own feelings of identity.

UNOBTRUSIVE OBSERVATION

ISSUE

It is important that visitors may make observations of activity areas, without disrupting the activity or altering behavior by their presence.

DISCUSSION

A chance to observe the class settings and activities can provide one with valuable information which cannot be fully communicated by other means. However, such observation should not interfere with the normal proceedings of the classes.

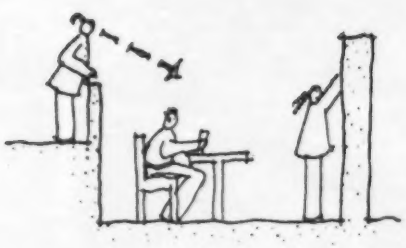
Teachers, parents, and administrators can all benefit from unobtrusive looks into the classroom. Parents need the chance to watch their children in settings outside the home, to see how they learn, work, and interact with others. Teachers can be introduced to new methods and watch how they work.

One critical point is to ensure that the children don't feel that they are being watched and that their activity isn't altered by the presence of adults. In order to ensure this, the place from which observation takes place should be removed, remote, or concealed from the activity area.

PRINCIPLE

Allow visitors to watch and listen in on activity areas without entering or conspicuously peering in.

RECOMMENDATIONS



- Concealed observation: build in an observation gallery with one-way mirrors between activity areas. The gallery should be darker than the outside room, and have writing surfaces and places to sit. (Abeson, Blacklow, 1971)
- Remote observation: if a definite physical solution is not possible, an area could be set aside--at the entrance, to the side--where groups can quietly gather to observe.
- Removed observation: closed circuit TV may be used in difficult cases.

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